


CONFIDENTIAL

parts
Ray

 25X1

This is a weekly status summary of the
23 items needing improvements which I spoke of. If you would
 APQ-56 Service Notes
 #3
 8 February 1957
like weekly report I will
forward to you
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SymptomProbable Cause

yes, please

R/T Unit

3.7.1 Excessive and erratic overall receiver noise figure. Fluctuations of 3 db are common.

Foreign material on body of pre-amp and afc crystals CR2601, CR2602, CR2701 and CR2702 (matched pairs 1N53M). Clean body of all crystals thoroughly with approved solvent.
NOTE: Remove all foreign material including any manufacturer's ink markings, labels, etc.

3.9 Poor target resolution and low signal crystal current.

The pulse response of the receiver is a function of signal crystal current and can result in severe ringing in the receiver. Since the reflected I-F input impedance (crystal impedance) varies widely at the extreme limits of crystal current, this detunes the over-coupled double-tuned pre-amplifier input transformer. To maintain proper match, the signal crystal current must be between the limits of 0.15 and 0.4 on the control panel meter on the T/R Test Set. These readings correspond to 0.3 and 0.8 ~~ma~~ absolute.

Test Equipment

6.0 No illumination from edge lights on focus and alignment fixture. (All 5 in. cameras) Dimmer potentiometer rotation is sticky.

Short circuit from junction of printed circuit solder joint (dimmer pot connection) to the frame of the focus and alignment fixture. For quick fix, solder jumper wire from printed circuit solder connection to top (hot) side of dimmer potentiometer and apply insulating tape over solder connection. Field mod kit, including new board and pot, will be available soon.

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APQ-56 Improvement Program

2/13/57

1.7 Resolution Problem -

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Presently, the resolution of the indicator is not equal to that of a 0.1 us transmitting and receiving system. To equalize these resolutions, all the CRT spot defining parameters are being examined in order to see if they can be improved. Laboratory inspection of the O2 recorder reveals that short time (ripple) and long time drifts of the +400 supply cause sweep position changes with considerable consequent loss of resolution. Beyond noting that "clear" phosphor can produce much smaller spot sizes than crystalline phosphors; no further "paper" investigation has been done.

2.7 Recorder Cooler -

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There are two phases - design of a permanent type cooler, and the design and production of a quick type cooler for the Time Shared recorder.

- 1) Permanent type cooler - One complete cooler is now in the Model Shop due out 2/21. Eleven complete sets are now being made in production.
- 2) Quick fix type cooler - The recorder top due out of the Model Shop 2/8 is overdue. When this is received, we will have one complete cooler. Four vent assemblies are now in the Model Shop due 2/15. Two blowers due 1/31 are now in incoming inspection. Four recorder tops will go to the Model Shop for assembly when one item is received, overdue from Model Shop 2/8.

3.7 10KV Supply Using AMP Rectifier Pack and Vacuum Tube Driver -

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Decision has been made to replace all 2JC2465 units with this combination. Engineering has ordered 35 units to cover all equipments and spares. AMP schedule is: Mockup by 2/21, first unit 3/27, 6 additional by 4/10, balance by 5/1. Driver chassis released to Model Shop on 2/5, to production 2/6. C/O adding the unit to recorder written 2/4, not released yet, waiting for Supervisors approval.

4.1 RF High Voltage Power Supply -

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All units are 90% complete with regard to wiring and as assembly. All arrangements for potting the units have been made and potting will commence as soon as the outstanding parts are received. Before potting, the H.V. capacitors which are glass inclosed need 4 coats of silastic. The silastic process involves 4 days. With 3 molds on hand, 9 working days will be required to imbed the 8 units requested. The imbedment process requires 3 days per unit. Four extra units are being built and will be available for tests or future disposal.

Outstanding parts
 R.F. Coils (Spellman)
 10KV capacitors
 HV connectors

W/S
 2/21
 2/18
 2/7

5.7 Camera Problems -

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- a) Overheating - Ventilated cover furnished for 03 set. Backplate seal pieces were improperly made. Replacement pieces from Model Shop came out 2/11. Covers on 01 and 02 lowered, will be exchanged for 04 and 05. Cover for 06 interferes with side rails, needs to be reworked. Not yet in MS.
- b) 5687 failure - Power dissipation is within ratings, and bulb temperature is within ratings at least at sea level. It is felt that this problem is related to the overall heat problem.
- c) Mk 14 Servo Motors - Motors have been ordered from Kearfott to replace all motors in cameras #MW0001 to MW0006. Kearfott has supplied complete environmental test data to Components. Motors in cameras MW0007 and up are Edison motors. Arrangements are being made to perform environmental tests on these motors. 5 Kearfott motors received to date. 2 supplied for sets 4 & 5. 1 used as replacement in set 1. 2 being held for emergency use wherever needed. Next shipment due 2/11.
- d) Burnout of Dimmer Pots - Specialties has been asked to investigate the rating of the pot under inrush current conditions. On one unit an intermittent short was discovered from the soldered joint on the contact board to ground. Field personnel have been asked to inspect for this condition on units in the field and to report findings. No report received as yet. 2 additional shorts found at Air Arm. Specialties has agreed to supply repair parts consisting of a redesigned printed circuit and new potentiometer for all focus fixtures. Printed circuits can be had by 2/15; other parts by 3/15.

6.7 P. E. Cell -

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We are designing and building P.E. cell test sets to establish the sensitivity of these cells. All sets have been completed. The correlation between sets is 12% and between bulbs in any one set is 8%. It has been found that the meters in the lamp circuit are not accurate to 2% of full scale. We are now in the process of calibrating them. The lamps have been found to be unstable with less than one hour warm-up. We are now in the process of determining the minimum warm-up required, since the life of each bulb is only 100 hours.

8.7 Noise Figure -

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Low noise figure hard to obtain and hard to keep. Propose to determine if crystals can be permanently damaged by excessive force during installation. Would be desirable to check impedance of mixer with slotted line and aid of Smith chart with proper terminations on waveguide outlets as compared with

impedance when mixer is terminated as it is presently used in equipment. No Progress has been made on noise figure this week due to fact that all available time is being spent on pulse width and despiking problem.

11.7 Quick Disconnect Waveguide - 25X1

Drawings done. Samples for field use being made in Model Shop. Promised 2/27. XAA drawings being modified to include quick disconnect.

12.7 Pulse Cable Connector - 25X1

Parts ordered from IPC. Connector for RF head end of cable received. Other parts due in Feb. Any changes in modulator or RF head which result in higher pulse voltages on this cable may cause future trouble due to breakdown.

13.7 AGC - s 25X1

Design a new AGC that will be less susceptible to stray pick-up and interference. A complete mechanical revision of the AGC has been checked out and has fulfilled the design goal. Drafting has started the final layout of the new chassis. An AOA has been released for the long lead-time items on the new chassis. Production will make seventeen units.

14.4 Trigger Circuit Redesign (overload at turn-on) - 25X1

A gas tube circuit employing a 2D21 thyratron was found to perform satisfactorily using a delay line load. However, when the output was applied to the KU-25 grid through a pulse transformer, overloading occurred. Some modifications have been made on the original circuit, and the problem of selecting a suitable pulse transformer is being investigated.

15.6 Maggie Pressurizing Cathode - 25X1

Still no good ideas.

17.3 Wideband Receiver Breadboard

Coil forms for Preamp due from Model Shop 2-8-57, received 2-12-57. Cover for Preamp due from Model Shop 2-6-57 still not received. Connectors for Video amp requested from Sherbondy via Woolley 2-6-57, not received. Borrowed scope reclaimed by owner, Pomeroy, promised to try to obtain suitable scope in a day or so. Paper design done. Construction to date seems to work as expected.

19.3 Receiver Design - 25X1

Curves were obtained presenting resolution as a function of I.F. bandwidth. The information plotted was for a rectangular pulse input and a filter characteristic obtained with a single pole, a three pole and a cascade of 4 three pole networks. The threshold of detectability in each case was assumed to

be 10% and 60%. Curves showing signal threshold power as a function of I.F. bandpass shape and width were also plotted for a rectangular pulse input. It appears that the gain in resolution obtained by making the bandwidth greater than 8 mc does not fully justify the loss in signal detectability which will occur. The decision pertaining to the bandwidth to be used will be made after other data concerning the resolution capabilities of the recorder and of the system itself are evaluated.

20.3 Pulse Width -

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To determine modulator components for optimum transmitter performance, the following steps are contemplated:

- a) construct & utilize both a hard tube & a line type modulator
- b) using info. obtained above re-design components (in particular the pulse transformer) for a 0.1 us pulse width

The hard tube pulser has been placed in operation and is now being mechanically modified so that various measurements can be performed on the 5789, Mag 400 and 6799 magnetrons. The work order for a 0.1 us pulse transformer has been released to components; the estimated delivery time is seven weeks.

21.2 Pulse Width (quick fix) -

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★ Pulse width too wide and too high peak voltages. A previous design ferrite pulse transformer was substituted for the pulse transformer now being used. Using this transformer in combination with a small choke coil in series with the thyatron plate and an RC circuit across the input of the pulse transformer, narrows down the pulse to approximately .1 us at the half power point. The peak voltages across the PFN and the pulse transformer are reduced to what seems to be reasonable limits at the expense of a higher high voltage power supply voltage. Magnetron failure has made this test inconclusive to date.